

An overview on the protected area system for forest conservation in Bangladesh

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Received: 2009-03-11; Accepted: 2009-04-20

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Abstract: A total of 19 protected areas (PAs) have been established in Bangladesh representing all the four forest types of the country. Apart from being the repository of biological diversity, these PAs serve as the source of subsistence livelihoods to the local communities. While all the PAs are managed by the state Forest Department (FD), with a view to ensure sustainability, a recent approach of co-management has been initiated in five PAs as a pilot project with an aid of development partners incorporating stakeholders' participation. Along with demonstrating a number of upbeat impacts, the initiatives exert some constraints which need to be addressed properly to ensure the success of participatory approach and enhance the ongoing conservation scheme. This paper reviews the published works, government and project documents to analyze the present status of PAs and suggest recommendations accordingly.

Keywords: Protected areas, biodiversity conservation, co-management, forest resources, Bangladesh

Introduction

Forestry is a productive sector with significant effects on meeting national socio-economic and environmental functions as well as the improvement of rural livelihoods (Mbuvi and Boon 2008). Increasing pressure on forest resources from multiple sectors exerts significant challenges to forest and environmental managers worldwide who must strike a balance between demand and

the need to protect these important renewable resources (Muhammed et al. 2008a). In correspondence with this prevailing situation, Matthews (2001) informed that deforestation rates have been increased in tropical Africa, remained constant in Central America and declined only slightly in tropical Asia and South America. It is, in fact, difficult to have reliable data on the actual rate of tropical forest resources and deforestation because of the different methods of forest resources assessment in tropical countries and the lack of uniform and generally accepted definitions (Goldsmith 1998). However, Appiah et al. (2008) explored the combined effect of several causes responsible for the shrinking of most of the accessible tropical forests, e.g., forest fires, logging, agricultural colonization, mining activities, wild land fires, and other development projects. Bangladesh, formed by a delta plain at the confluence of three big rivers- the Padma, the Meghna, the Jamuna - and their tributaries, possesses a tropical monsoon climate and harbors a huge biological diversity. But, with a total land area of only 147 570 km² and high population density (1079 people/km²), a tremendous pressure has been exerting on its limited resources which also affects the forest reserves both in explicit and implicit ways (FAO 2007). Muhammed et al. (2008a) mentioned that forests in Bangladesh are deteriorating at an alarming rate due to various socio-economic threats, biotic pressures and competing land uses. The high degree of dependency that many people have on the forests for their livelihoods has resulted in depletion of natural resources and degradation of forest ecosystems countrywide (Muhammed et al. 2008b). FAO (2007) assessed the annual rate of negative change of forests by 2000 ha per year or 0.3% in 2000-2005 in Bangladesh. At an annual population growth rate of 1.7% (FAO 2007), such deforestation is likely to continue and forests are likely to disappear by next 35–40 years or earlier (Nishorgo 2008). Realizing such threats, Bangladesh government has explored and implemented some alternative forest management strategies for the conservation purposes (Rana et al. 2007); forests or part of forests have been declared as protected areas according to the IUCN categories. But, simple declaration of PAs has not functionally worked in the prevention of loss of biodiversity. Because local communities are put to hardships after notifi-

The online version is available at <http://www.springerlink.com>

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cation of a forest as PA mainly due to the curtailment of the flow of forest resources for their livelihoods through strict regulation, considering the pragmatism, the government initiated collaborative management approach with the active participation of local communities in five PAs as pilot projects. This paper summarizes the available information on the current status of PAs and enunciates future policy implications with a view to enhance biodiversity conservation with fruitful participation of the stakeholders.

Forests setting of Bangladesh

The total area of forestland of Bangladesh is 2.52 million ha of which the Forest Department (hereafter FD) manages 1.52 million ha (Table 1). The other 0.73 million ha designated as Unclassed State Forest (USF) are under the control of Ministry of Land and the remaining 0.27 million ha fall under the category of village forests that are under private ownership (BFD 2008). However, contradiction exists on the actual coverage of the forests (Mukul et al. 2008). Forest Resources Assessment 2005 (FAO 2007) shows the total area of forest is 0.87 million ha (some 6.7% of the country's total area). This includes only the designated government reserved and protected forests excluding the USF, plantations, village forests and other private forests (Muhammed et al. 2005).

Table 1. Total forestlands of Bangladesh (BFD 2008).

Category		Area (million ha)	Percentage of total land
Forest Department (FD) managed forests	Hill Forests	0.67	4.54
	Natural Mangrove Forests	0.60	4.07
	Mangrove Plantations	0.13	0.88
	Plain Land Sal Forest	0.12	0.81
Total		1.52	10.30
Unclassed State Forest (USF)		0.73	4.95
Village Forest		0.27	1.83
Grand Total		2.52	17.08

The tropical evergreen and semi-evergreen forests (commonly known as hill forests) of Bangladesh occur in hilly areas of the northeastern and southeastern region, tropical moist deciduous forests (commonly known as Sal forests) are distributed in the central and a little part of northwestern region, the mangrove forest (commonly known as Sundarban) lie in the southwestern portion facing the Bay of Bengal, and the freshwater swamp forest (commonly known as reed-land forest) is located in the low-lying wetland areas of northeastern region of the country. According to recent estimate, the total growing stock of Bangladesh's forests is 30 million m³ and the total biomass 63 million tons (FAO 2007), which contributes to wellbeing of the countrymen both in tangible and intangible ways such as by maintaining the quality of local and national environment, adding input in GDP, and providing livelihoods to local communities (Iftekhhar 2006). The village forests or village groves in the country are the homesteads and are entirely private properties (Khan et al. 2007). These traditional homesteads are the domi-

nating feature in the rural landscape of Bangladesh (Iftekhhar 2006), forming the most productive tree resources of the country (BFD 2008). Vergara (1997) revealed that about 70% of fuel wood and timber and 90% of bamboos used in construction and cottage industries come from homesteads whilst Mustafa et al. (2002) reported about 55% of the national requirement of timber, fuel wood, and bamboo are met from those informal forests.

Scenario of Biodiversity

Bangladesh vegetation is a transition of Indo-Malayan region, which is one of the ten global hot-spot areas for biodiversity (Mittermeier et al. 1998). The hill forests are characterized as mixed evergreen forests where tropical evergreen plant communities are mixed with tropical deciduous trees, in association with diverse herbs, shrubs, and bamboo jungles. In Sal forest, 70%–75% of the trees are Sal (*Shorea robusta*) associated with other semi-evergreen and deciduous plants (BCAS 2008). The Sundarban, the largest single tract of mangrove forest in the world (Iftekhhar 2006) has a unique combination of terrestrial and aquatic ecosystem and is the home to several uniquely adapted floras with a total of 334 species including 13 orchids and 23 medicinal plants (BCAS 2008).

The country is also rich in faunal diversity by housing 110 inland and 3 marine mammals, 109 inland and 17 marine reptiles, 22 amphibians, 388 resident and 240 migratory birds, 266 freshwater and 442 marine fish, 4 freshwater and 11 marine crabs, 2493 insects and 66 species of corals (IUCN 2000). According to BCAS (2008), singly the Sundarban supports 42 species of mammals, 35 reptiles, 8 amphibians, 270 birds, 7 crabs, 400 fish and 77 species of insects and the reed-land forest bears 27 mammals, 22 reptiles, 9 amphibians and 49 birds.

Table 2. Number and status of vertebrate species of Bangladesh (IUCN 2000).

Group	Total no. of existing species	Extinct species	Threatened species			Total
			Critically endangered	Endan- gered	Vulner- able	
Inland Mammals	110	10	21	13	6	40
Inland Reptiles	109	1	12	24	22	58
Inland Amphibians	22	0	0	3	5	8
Resident Birds	388	2	19	18	4	41
Total	629	13	52	48	38	147

But the biodiversity of Bangladesh is subject to depletion due to various kinds of human induced interventions and activities. Many of the plants and animals have either vanished or have been on their way to waning because of habitat loss (Iftekhhar 2006, Muhammed et al. 2005). Bangladesh National Herbarium already identified 106 vascular plant species under risk of various degrees of extinction in the country (Khan et al. 2001). On the other hand, Islam (2004) reported that 95 vascular plants have been rated as threatened, of which 92 are angiosperms and

3 gymnosperms. Regarding the fauna, Rahman (2004) reported about 12 wildlife species are extinct from the country and IUCN (2000) in its Red Data Book, listed a total of 40 mammals, 58 reptiles, 8 amphibians, and 41 resident bird species as threatened (Table 2). Therefore, it seems that the state of Bangladesh's biodiversity has been worsening day by day.

Conservation scheme through protected areas

Declaration of PAs has long been the most effective and widespread measure for conserving nature and natural resources around the world (Mukul 2007), which cover 11.5% of the earth's land surface (Chape et al. 2003) and only 5% of the tropical forest area (Dupuy et al. 1999). The Bangladesh government realized the weakness of conventional forest management and continued depletion of forest resources and started to establish PAs in its national forests since 1960. The first declaration of PAs was under the provision of the Forest Act 1927, which got the momentum after the enactment of the Bangladesh Wildlife

(Preservation) Order 1973. With the course of this Order, the government articulated national responsibility for the conservation of wildlife species, their habitats as well by allowing the designation of three IUCN categories of PAs: national parks, wildlife sanctuaries and game reserves (Box 1), corresponding to the IUCN categories II, IV and VI, respectively (IUCN 1994). Till to date, there are 19 PAs in Bangladesh and one more has been proposed and on its way to be announced likely. Among these, 10 are national parks, 9 wildlife sanctuaries and only 1 is game reserve (Table 3 and Fig. 1). Additionally, there are 5 eco-parks and 1 safari park in Bangladesh, which have also been recognized as PAs in general. These have been established and managed as such but not declared under any legal provision; rather, established as development projects of the government. Although these are extremely small in comparison to the standard classes of PAs and are designated to serve a 'nature recreation' need rather than a large scale 'nature conservation' need (USAID 2005), are contributing significantly to biodiversity preservation as the *ex situ* conservation strategy (Mukul 2007).

Table 3. List of protected areas of Bangladesh (Nishorgo 2008).

Sl. No.	Protected Areas	Forest Types	Location (District)	Area (ha)	Established (Extended)
A. National Parks (IUCN category V)					
01	Modhupur NP	Sal Forest	Tangail	8436	1962 (1982)
02	Bhawal NP	Sal Forest	Gazipur	5022	1974 (1982)
03	Himchari NP	Hill Forest	Cox's Bazar	1729	1980
04	Lawachara NP	Hill Forest	Maulvibazar	1250	1996
05	Kaptai NP	Hill Forest	Rangamati	5464	1999
06	Ramsagar NP	Sal Forest	Dinajpur	27.75	2001
07	Nijhum Dweep NP	Coastal Mangrove	Noakhali	16352.23	2001
08	Medha Kachapia NP	Hill Forest	Cox's Bazar	395.92	2004
09	Satchari NP	Hill Forest	Habiganj	242.82	2005
10	Khadimnagar NP	Hill Forest	Sylhet	679	2006
B. Wildlife Sanctuaries (IUCN category IV)					
11	Sundarban (East) WS	Natural Mangrove	Bagerhat	31226.94	1960 (1996)
12	Pabla khali WS	Hill Forest	Rangamati	42087	1962 (1983)
13	Char Kukri Mukri WS	Coastal Mangrove	Bhola	40	1981
14	Chunati WS	Hill Forest	Chittagong	7761	1986
15	Rema-Kalenga WS	Hill Forest	Habiganj	1795.54	1996
16	Sundarban (South) WS	Natural Mangrove	Khulna	36970.45	1996
17	Sundarban (West) WS	Natural Mangrove	Satkhira	71502.13	1996
18	Fashiakhali WS	Hill Forest	Cox's Bazar	1302	2007
19	Hajarikhil WS (Proposed)	Hill Forest	Chittagong	2908	-
C. Game Reserve (IUCN category VI)					
20	Teknaf GR	Hill Forest	Cox's Bazar	11615	1983
D. Eco-Parks and Safari Park					
01	Sita-Kunda EP	Hill Forest	Chittagong	808	1998
02	Madhu-Tila EP	Sal Forest	Sherpur	100	1999
03	Madhob-Kunda EP	Hill Forest	Maulvibazar	266	2001
04	Banskhal EP	Hill Forest	Chittagong	1200	2003
05	Kua-Kata EP	Coastal Mangrove	Patuakhali	5661	2006
06	Dulahazara SP	Hill Forest	Cox's Bazar	900	1999

Box 1. Definitions of different PAs under the Bangladesh Wildlife (Preservation) Order 1973.

National Park: means comparatively large area of outstanding scenic and natural beauty with the primary object of protection and preservation of scenery, flora and fauna in natural state to which access for public recreation and education and research may be allowed (Article 2(h)).

Wildlife Sanctuary: means an area closed to hunting, shooting or trapping of wild animals and declared as such under article 23 by the government as undisturbed breeding ground primarily for the protection of wildlife inclusive of all natural resources, such as vegetation, soil and water (Article 2(p)).

Game Reserve: means an area declared by the government as such for the protection of wildlife and increase in the population of important species wherein capturing of wild animals shall be unlawful (Article 2(c)).

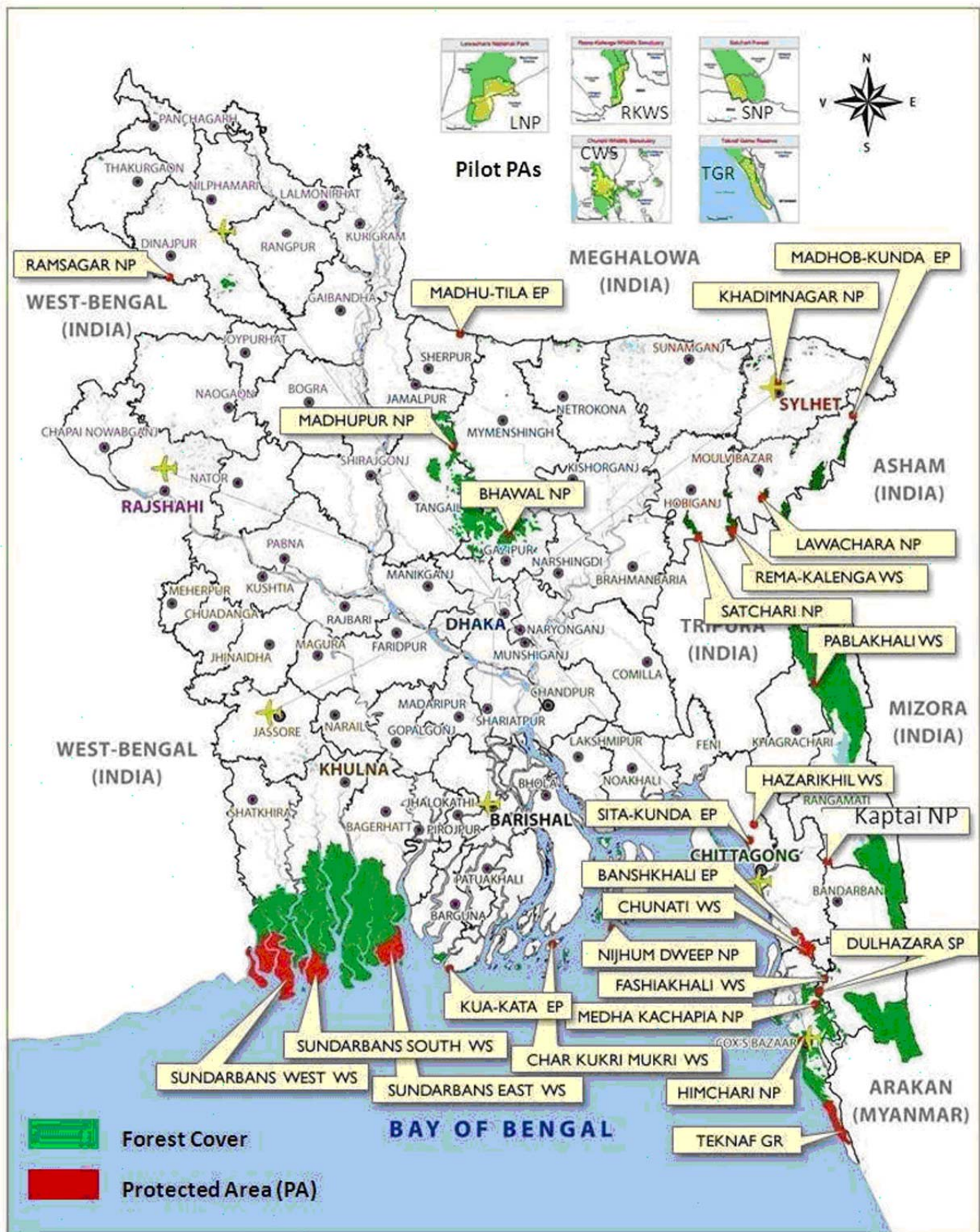


Fig. 1 Map of Bangladesh showing the protected areas (PAs).

Co-management Initiatives

Experience has shown that legal protection alone is not enough to ensure effective conservation activity. A possible alternative is multiple use forest management, which incorporates harvesting of forest products within a framework of sustainable management that aims at both conserving biodiversity and supplying to local people and the national economy (Dupuy et al. 1999). This can be guaranteed if effective relationships between the conservation areas and local communities are maintained (Schellhas et al. 2002). Co-management approach has evolved through various iterations and the way they are implemented on the ground varies (Arnold and Bird 1999). In the South Asian context, co-management is widely used to describe a situation, where a partnership is developed with other relevant stakeholders that specifies and guarantees their respective functions, rights, responsibilities with regard to PAs (Borrini-Feyerabend 1996). The history of co-management in South Asia has been long, but the systematic approach to its management is recent (Rao 1997). In Bangladesh, people's participation in forest management started in 1979 as *Betagi-Pomora* Community Forestry Project on government owned denuded hilly forest land. Subsequently, a number of projects of participatory forestry had been executed by the FD. Realizing the success of people-oriented programmes as in social forestry in Bangladesh (Rana et al. 2007, Muhammed et al. 2005, 2008b), the FD launched a co-management programme as Nishorgo Support Project (NSP) in the country's protected areas in 2004 with the financial assistance of USAID (Sharma et al. 2008). Initially the project was implemented in five pilot sites, viz., Lawachara National Park (LNP), Satchari National Park (SNP), Rema-Kalenga Wildlife Sanctuary (RKWS), Chunati Wildlife Sanctuary (CWS) and Teknaf Game Reserve (TGR). NSP aims to collaboratively develop co-management agreements leading to measurable improvements in forest and resource conservation in pilot PAs and their buffer zones with some specific objectives (Nishorgo 2008).

Implementation Strategy of Co-management Approach

People's participation becomes effective when the right incentives are offered to and roles are clearly defined of the participants (Sawhney et al. 2007). In Bangladesh, the co-management actors are the FD as the legal management authority of PAs and the local and national stakeholders of forest resources. Of them, local stakeholders are basically the poor ones who mainly depend on those forested areas for subsistence livelihoods. But, the activities of socially and economically powerful forest destroyers stand against the poor local communities. Considering the objectives, institutional structures were formed officially in the name of Co-management Council and Co-management Committee (CMC) for the five pilot sites, according to the proposition of NSP in 2006 (Bangladesh Gazette No. pabama/parisha-

4/nishorgo-64/(part-4)/112 dated August 10 2006) with representation from civil society, local government, local residents and resource user groups, and other government agencies. The CMC is primarily responsible for overall management of the PA including the landscape, which includes an area covering five kilometers from the boundary of the respective PA. The committee can recruit some members of the community to patrol the forest on a regular basis and pay them an amount for the services rendered from its own fund. For the financial sustainability of the CMC, there is a provision of turning a portion of the income generated from eco-tourism and other exhibits in PAs over to the committee.

The project applied some strategies with a view to regulating forest use which includes development of different Alternative Income Generation (AIG) activities (Mukul and Quazi 2007) for distributing among local stakeholders forming Forest User Groups (FUG). These AIG activities are, in some cases, ethnicity-specific and varies region to region according to the communities' needs and limitations, offering a number of options as cow fattening both for beef and milk, poultry rearing, nursery production, improved stoves manufacture, nature tourism and eco-lodge, eco-guiding, service enterprises in PAs, elephant rides as tourist amusement, tribal cloths manufacture, date palm leaf based cottage industry, social forestry in buffer zone for poles/logs, fuel wood and medicinal plants cultivation, direct payments for conservation, access to capital such as NGO micro-finance, CMC-led microfinance, linkages to existing Micro Finance Institutions (MFIs) and matching grants (DeCosse 2006).

Impact of Co-management Approach on Forest Conservation

Co-management strategy accompanied by AIG activities in pilot PAs has been demonstrating upbeat impacts in Bangladesh which has been evident from several studies conducted by the FD. These impacts are visible in a variety of aspects, e.g., preservation of biodiversity, reduction in dependency on forest resources, socio-economic upliftment of local communities, women's empowerment, and self-reliance etc. In general, the principal cause of forest loss in PAs is human-induced removal of woody biomass, in the form of timber and fuel wood. Against the interventions within the stipulated project period, the implementing agencies foresee a reduction in fuel wood removal and illegal logging, which will lead to a gradual re-establishment of forest habitats, especially natural regeneration of trees, shrubs and herb, and consequently support the biodiversity within the PAs (Aziz et al. 2004). The authority's prediction is becoming right which has been manifested by the findings of a study conducted in Lawachara National Park. Subhani (2008) reported that a majority of female members of the FUG left the profession of fuel wood collection after involvement in co-management activities in Satchari National Park, who feel that their participation in FUG helps increase their skills, decision-making power and respect in the eyes of the members of family and society. Nearly half of the women earn income independently in Lawachara

National Park since their participation in co-management, who categorized ‘saving money’ and ‘preserving biodiversity’ as the top two reasons for joining FUG (Shewly 2008). Adopting the Sustainable Livelihood Approach (Ashley and Carney 1999) in Chunati Wildlife Sanctuary, Hoque (2008) revealed that the socio-economic conditions of the FUG members improved after participation in co-management which made them socially empowered, more apt to interact with community members as well. Regarding the impact on biodiversity status, density (number/sq km) of both the red jungle fowl (*Gallus gallus*) and puff-throated babbler (*Pellorneum ruficeps*), two common bird species considered as the key biodiversity indicators in Bangladesh forests (Aziz et al. 2004), has been increased in 2006 with compared to that of 2005 in the entire five pilot PAs (Nishorgo 2007).

Conclusion

Like other developing countries, degradation in Bangladesh’s forests results from increasing population pressure on forest resources, lack of funds to maintain sufficient staff to patrol it, and the growing public and political view that people have a right to use forests (Skutsch, 2000). But, tandem use of community-based natural resource management can help promote appropriate utilization of forest resources with social, economic and environmental benefits (IIRR 1996). PAs can be precious assets to recognize rights, alleviate poverty and find solutions to human-wildlife conflict (Dudley et al. 2005) after building partnerships with the communities living within or near those and addressing their needs for forest resources for livelihoods (Lai 2003). Although such systems have already been implemented in Bangladesh forestry and some hopeful impacts have been displayed, still there remain inadequacies. The most precarious shortfall is inter- and intra-policy conflicts in different sectors of the government. Hossain (2008) also conceded that the FD initiatives to involve local people in conservation are impeded by, and sometimes contradictory to, national laws and policies. Mukul and Quazi (2007) noticed definite positive changes in the management of PAs with local people’s participation and introduction of AIG activities for them. At the same time, like several other researchers (e.g., Aziz 2008, Karim 2008, Mahmood 2008), they observed some incongruities in the formation of CMC and distribution of AIG supports to the local communities which may hamper achieving goals of the overall co-management mission. The most common anomalies are dominating CMC by local elites rather than the poor stakeholders, lack of basic democratic norms in CMC, inequities in the distribution of AIG opportunities focusing heavily on a small number of high-interest groups. With all these constraints, however, there is the matter of hope for better management of PAs and conservation of biodiversity learning the instances both inland and outside border. IUCN-Bangladesh had been able to restore 16 ha of forestland with the implementation of community-based pilot project for the restoration of degraded forests in Chittagong Hill Tracts, the southeastern hill forest region of the country (Nishat and Biswas, 2005). Considering the overall circumstances, some measures can,

therefore, be suggested:

Heavily involved members of the local elites and local governments in administrative bodies for CMC compared to the villagers sometimes take over the CMC meetings to further their own personal agendas. This detracts the community from attending to important administrative concerns of the PAs that ultimately affects the forest protection. Therefore, this major power division should be addressed by the project implementing authority and effective measures should be taken to ensure the real representation of the key stakeholders of those forests.

The inequity in the distribution of AIG opportunities with some households receiving training and supplies for more than one activity, while others receive none in almost all the pilot PAs may hoist conflicts among the stakeholders. Thus, a better coordination between the FD and intended beneficiaries is to be demanded. Alongside, more consistent monitoring should be adopted to ensure that AIG support is equitably and effectively distributed.

Since all the PAs are affluent with non-timber forest products (NTFPs) which local communities have been collecting traditionally, attempts should be taken for cultivation and domestication of those NTFPs in home gardens and buffer zones to allow the forest villagers to continue living in a sustainable manner both by personal and commercial utilization. Extraction of fuel wood from PAs is one of the major causes of degradation curbing which would create an ethical dilemma as many local people depend on it to meet their energy needs, the most important of which is cooking (Quazi et al. 2008). Hence, buffer zone based plantations for fuel wood species would be an efficient option to reduce pressure on forests in the energy-deficit country like Bangladesh.

The government policies in different sectors need to be revised to enable more effective co-management structures and processes, while international policies concerning PAs have been changing over time, from classic, scientific and exclusionary approaches to more human-centered models, often based on neo-liberal economic precepts (Berkes 2004). Iftekhhar (2006) urged on the incorporation of forest views in other sectors’ planning along with the addressing other stakeholders’ views, during forest planning.

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